

What is claimed is:

1. An apparatus for controlling an intake air amount of an internal combustion engine provided with a variable valve mechanism that varies at least a valve operating characteristic of an intake valve, comprising:
 - an operating condition detecting unit that detects operating conditions of said engine;
 - a valve operating characteristic detecting unit that detects the valve operating characteristic of said intake valve; and
 - a control unit that sets a target intake air amount equivalent to a target torque according to the operating conditions of the engine, sets a target valve operating characteristic based on the set target intake air amount, and controls said variable valve mechanism so that the valve operating characteristic of said intake valve reaches said target valve operating characteristic,
 - wherein said control unit performs a correction according to a valve lift amount of said intake valve to set said target valve operating characteristic.
2. An apparatus for controlling an intake air amount of an internal combustion engine according to claim 1,
 - wherein said control unit performs said correction according to the valve lift amount of said intake valve in a low valve lift region where the valve lift amount of said intake valve is lower than a predetermined amount.
3. An apparatus for controlling an intake air amount of an internal combustion engine according to claim 1,
 - wherein said control unit performs a correction according to closing timing of said intake valve to set said target valve operating characteristic.
4. An apparatus for controlling an intake air amount of an internal combustion engine according to claim 1,
 - wherein said control unit divides said target intake air amount by an engine rotation speed and total cylinder volume to calculate a target volume flow ratio in said intake valve, converts said target volume flow ratio into an opening area of said intake valve to set as a target valve opening area, and sets said target valve operating characteristic based on said target valve opening area.
5. An apparatus for controlling an intake air amount of an internal combustion engine according to claim 1,
 - wherein said control unit;

in a high valve lift region where the valve lift amount of said intake valve is equal to or larger than a predetermined amount, divides said target intake air amount by an engine rotation speed and total cylinder volume to calculate a target volume flow ratio in said intake valve, performs a first correction according to closing timing of said intake valve on said target volume flow ratio, and sets said target valve operating characteristic based on the target volume flow ratio after said first correction, and

in a low valve lift region where the valve lift amount of said intake valve is less than said predetermined amount, further performs a second correction according to the valve lift amount of said intake valve on the target volume flow ratio after said first correction, and sets said target valve operating characteristic based on the target volume flow ratio after said second correction.

6. An apparatus for controlling an intake air amount of an internal combustion engine according to claim 5,

wherein in said first correction, said target volume flow ratio is increasingly corrected as closing timing of said intake valve is further advanced, and

in said second correction, said target volume flow ratio is decreasingly corrected as the valve lift amount of said intake valve is lower.

7. An apparatus for controlling an intake air amount of an internal combustion engine according to claim 1,

wherein said variable valve mechanism comprises:

a drive shaft rotating in synchronism with a crankshaft of the engine;

a drive cam fixed to said drive shaft;

a swing cam swinging to operate said intake valve to open and close;

a transmission mechanism with one end connected to said drive cam side and the other end connected to said swing cam side;

a control shaft having a control cam changing the position of said transmission mechanism; and

an actuator rotating said control shaft, and

wherein the valve lift amount of said intake valve is successively changed by rotatingly controlling said control shaft by said actuator.

8. An apparatus for controlling an intake air amount of an internal combustion engine provided with a variable valve mechanism that varies at least a valve operating characteristic of an intake valve, comprising:

operating condition detecting means for detecting operating conditions of said engine;

valve operating characteristic detecting means for detecting the valve operating

characteristic of said intake valve;

target intake air amount setting means for setting a target intake air amount equivalent to a target torque according to the operating conditions of the engine;

target valve operating characteristic setting means for setting a target valve operating characteristic based on said target intake air amount; and

variable valve mechanism control means for controlling said variable valve mechanism so that the valve operating characteristic of said intake valve reaches said target valve operating characteristic,

wherein said target valve operating characteristic setting means performs a correction according to the valve lift amount of said intake valve to set said target valve operating characteristic.

9. A method of controlling an intake air amount of an internal combustion engine provided with a variable valve mechanism that varies at least a valve operating characteristic of an intake valve, comprising:

setting a target intake air amount equivalent to a target torque according to detected operating conditions;

performing a correction according to a valve lift amount of said intake valve to set a target valve operating characteristic of said intake valve for ensuring said target intake air amount; and

controlling said variable valve mechanism so that the valve operating characteristic of said intake valve reaches said target valve operating characteristic.

10. A method of controlling an intake air amount of an internal combustion engine according to claim 9,

wherein said correction according to the valve lift amount of said intake valve is performed in a low valve lift region where the valve lift amount of said intake valve is lower than a predetermined amount.

11. A method of controlling an intake air amount of an internal combustion engine according to claim 9,

wherein a correction according to closing timing of said intake valve is performed to set said target valve operating characteristic.

12. A method of controlling an intake air amount of an internal combustion engine according to claim 9,

wherein said target intake air amount is divided by an engine rotation speed and total cylinder volume to calculate a target volume flow ratio in said intake valve, said target volume flow ratio is converted into an opening area of said intake valve to be set

as a target valve opening area, and said target valve operating characteristic is set based on said target valve opening area.

13. A method of controlling an intake air amount of an internal combustion engine according to claim 9,

wherein, in a high valve lift region where the valve lift amount of said intake valve is equal to or larger than a predetermined amount, said target intake air amount is divided by an engine rotation speed and total cylinder volume to calculate a target volume flow ratio in said intake valve, a first correction according to closing timing of said intake valve is performed on said target volume flow ratio, and said target valve operating characteristic is set based on the target volume flow ratio after said first correction, and

in a low valve lift region where the valve lift amount of said intake valve is less than said predetermined amount, a second correction according to the valve lift amount of said intake valve is further performed on the target volume flow ratio after said first correction, and said target valve operating characteristic is set based on the target volume flow ratio after said second correction.

14. A method of controlling an intake air amount of an internal combustion engine according to claim 13,

wherein in said first correction, said target volume flow ratio is increasingly corrected as closing timing of said intake valve is further advanced, and

in said second correction, said target volume flow ratio is decreasingly corrected as the valve lift amount of said intake valve is lower.

15. A method of controlling an intake air amount of an internal combustion engine according to claim 9,

wherein said variable valve mechanism comprises:

a drive shaft rotating in synchronism with a crankshaft of the engine;

a drive cam fixed to said drive shaft;

a swing cam swinging to operate said intake valve to open and close;

a transmission mechanism with one end connected to said drive cam side and the other end connected to said swing cam side;

a control shaft having a control cam changing the position of said transmission mechanism; and

an actuator rotating said control shaft, and

wherein the valve lift amount of said intake valve is successively changed by rotatingly controlling said control shaft by said actuator.